

Vision in the deep ocean

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For many animals inhabiting the deep-sea, a central theme is to see but not be seen yourself. This has not only driven the evolution of unique visual systems, but often is accompanied by remarkable camouflage strategies. Deep-sea animals have exploited nearly all eye designs known to nature, ranging from the extraordinary camera-type eyes of barreleye fishes to the highly diverse compound eyes of hyperiid amphipods.

The aim of this special session is to highlight visual ecology in the deep ocean, bringing together a diverse range of scientists, animal models and research approaches.

In recent years, research on visual systems in the deep-sea has made remarkable progress. A few examples include the unique development of optic lobes in a pelagic larval crustacean, the ultra-black camouflage strategy of certain fishes or the spectral tuning of some deep-sea shrimp. In addition, recently developed software to analyze sampling resolution in compound eyes, based on 3D micro-computed tomography images, yields exciting opportunities for analysis of the vast diversity of compound eyes in the ocean. As underwater technology and molecular and computational methods advance, new discoveries on the complexity of vision in the deep-sea are being made each year.

Besides highlighting pioneering research, I hope that this special session promotes new ideas and collaborations. Both specialists and non-specialists should feel encouraged to discuss and think about the many unanswered and fascinating questions left about vision in the deep.